REMARKS

Claims 13-21, 31-36, 39-42, and 46-49 are pending in the application, claims 43-45 being canceled and claims 46-49 being newly added herein. Claims 1-12, 22-30, 37, and 38 were previously canceled owing to a Restriction Requirement. Claims 13, 31, 39, 46, and 47 are the only independent claims.

Claims Rejections - 35 U.S.C. § 112

Claims 43-45 were rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

In particular, the Examiner maintains that the specification is non-enabling with respect to the producing of an internal structure model and with respect to maintaining the sensors in fixed relation to a patient during data-gathering. More specifically, the Examiner contends that the term "model" is not found in the specification of this or patent cases and that the terms "fix" or "maintaining" or sustaining fixation are not found in the specification.

Applicants respectfully traverse the rejection of claim 43 under 35 U.S.C. § 112, first paragraph. With respect to the term "model" applicants note the following passages from the specification:

> Thus, a range of frequencies is useful for obtaining sufficient data to construct electrically or digitally encoded three-dimensional models of internal tissue and organ structures of a patient. [Page 27, lines 16-18.]

> Image processor 450 utilizes the increased resolution data from module 448 (if CAC is performed) to perform 3D image processing, which includes, as special cases, 1D and 2D image processing as well. 3D image processing can be used to construct three-dimensional models or analogs of internal tissue structures of a patient during a real time scanning operation. [Page 55, lines 5-8.]

Applicants respectfully submit that the specification is sufficiently clear to enable one of ordinary skill in the art to apprehend that an "electronic model" is electronically encoded data that defines detected three-dimensional structural features of a tissue structure. A model pursuant to the present invention as set forth in claim 43 is merely an electronically encoded representation of internal tissue structures detected by the disclosed ultrasonic scanning process.

With respect to fixing the sensors relative to the patient, applicants have eliminated this phraseology from the pending claims. This phraseology was intended to point out that applicants' invention contemplates no moving of the ultrasonic sensors by an operator during a scanning process. This is considered a distinguishing difference between applicants' invention and the known prior art.

Applicants have instead submitted amended or new claims that positively recite the electronic scanning operations pursuant to applicants' invention. More particularly, claim 45 has been canceled herein and replaced with new independent claim 48, directed to a medical scanning method comprising (a) providing a plurality of electromechanical sensors mounted to a carrier, (b) disposing the carrier in relation to a patient, (c) thereafter activating the sensors to effectuate a solely electronic ultrasonic-wave scan of internal organic structures of the patient resulting in encoded three-dimensional structural data pertaining to the internal organic structures, and (d) operating on the data from the sensors to produce an electronically encoded three-dimensional model or analog of the internal organic structures.

In this claim the term "model" is defined by an alternate word, "analog," that appears in the specification and clarifies that the produced model is an electronic parallel, correspondent, or representation of the detected internal organic structures. Also, instead of reciting that the sensors or the carrier is maintained in fixed relation to the patient, this claim sets forth the operation of activating the sensors to effectuate a solely electronic ultrasonic-wave scan of internal organic structures. In contrast, the prior art as

represented by U.S. Patent No. 5,152,294 to Mochinski et al. includes a mechanical motion in at least one dimension or along at least one axis to collect sufficient ultrasonic waveform data as to a three-dimensional internal structure.

Claims Rejections - 35 U.S.C. §§ 102 and 103

Claims 13, 18, 20-21, and 43-45 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. U.S. Patent No. 5,152,294 to Mochinski et al.

Claim 14 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Mochinski et al. in view of U.S. Patent No. 6,213,948 to Barthe et al.

Claims 15-17 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Mochinski et al. in view of Barthe et al. and further in view of U.S. Patent No. 5,275,470 to Matsushima et al.

Claims 19 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Mochinski et al. in view of Barthe et al. and further in view of U.S. Patent No. 5,113,706 to Pittaro.

Claims 31-36 and 39-42 have been allowed.

The Invention As indicated above, applicants' invention, as described in the specification, is directed to a method of scanning internal body tissues of a patient solely electronically. No mechanical movement of a probe or sensing device is required to gather data as to a three-dimensional internal organic structure. In practice, a technician merely places a sensor carrier in pressure-wave-transmitting contact with a patient and then the patient is electronically scanned with the sensors just sitting up against the patient.

Claim 13 Applicant has amended claim 13 herein to provide a better definition of the invention. Applicant respectfully maintains that claim 13 distinguishes the invention over the prior art and particularly over U.S. Patent No. 5,152,294 to Mochinski et al.

As set forth in amended claim 13, a medical method comprises (i) providing a carrier holding a multiplicity of electromechanical transducers, (ii) placing the carrier and a patient adjacent to one another so that the transducers are disposed in effective pressure-wave-transmitting contact with the patient, (iii) supplying a first plurality of the transducers with electrical signals of at least one pre-established ultrasonic frequency to produce first pressure waves in the patient, (iv) receiving, via a second plurality of the transducers, second pressure waves produced at internal tissue structures of the patient in response to the first pressure waves, (v) performing electronic 3D volumetric data acquisition by solely an electronic scanning of the internal tissue structures, and (vi) performing electronic 3D imaging of the internal tissue structures in part by analyzing signals generated by the second plurality of the transducers in response to the second pressure waves, at least one of the supplying and receiving steps being executed to effectuate the electronic scanning of the internal tissue structures.

U.S. Patent No. 5,152,294 to Mochinski et al. neither discloses nor suggests a method wherein electronic 3D volumetric data acquisition is performed by solely an electronic scanning of internal tissue structures. In fact, Mochinski et al. require a mechanical motion, particularly, a swinging, of a transducer unit to accomplish the data acquisition necessary for 3D volumetric detection and representation (i.e., imaging).

Applicant's amendment of claim 13 to recite that 3D volumetric data acquisition is performed by solely an electronic scanning of said internal tissue structures is not new matter, even though the word "solely" did not originally appear in the application. The application explains how the ultrasonic scanning carrier is placed against the patient and how electronic scanning effectuates acquisition of structural data in three dimensions. One of ordinary skill in the art would understand that applicants' invention is directed to a scanning process where all data is acquired solely through electronic signal processing alone, without any other kind of scanning such as mechanical movement.

The specification ahs been amended for antecedent basis. Again, this is not considered new matter but merely an explicit designation of applicants' process clearly understandable to one of ordinary skill in the art.

Claim 46 New claim 46 is directed to a medical method comprising (1) providing a carrier holding a multiplicity of electromechanical transducers, (2) placing the carrier and a patient adjacent to one another so that the transducers are disposed in effective pressure-wave-transmitting contact with the patient, (3) supplying a first plurality of the transducers with electrical signals of at least one pre-established ultrasonic frequency to produce first pressure waves in the patient, (4) receiving, via a second plurality of the transducers, second pressure waves produced at internal tissue structures of the patient in response to the first pressure waves, (5) executing the supplying and receiving steps to effectuate an electronic scanning of the internal tissue structures in elevation and an electronic scanning of the internal tissue structures in azimuth, thereby acquiring electronic 3D volumetric data, and (6) performing electronic 3D imaging of the internal tissue structures in part by analyzing signals generated by the second plurality of the transducers in response to the second pressure waves.

The Mochinski et al. reference (Mochinski) is directed to a scanning process wherein scanning is effectuated in one dimension by mechanically swinging a transducer array relative to the scan target. Mochinski does not teach or suggest executing signal supplying and receiving steps to effectuate an electronic scanning of internal tissue structures in elevation and an electronic scanning of the internal tissue structures in azimuth, to acquire electronic 3D volumetric data.

Claim 47 New claim 47 is drawn to a medical method comprising (A) providing a plurality of electromechanical sensors mounted to a carrier, (B) disposing the carrier in relation to a patient, (C) thereafter activating the sensors to effectuate a solely electronic ultrasonic-wave scan of internal organic structures of the patient resulting in encoded three-dimensional structural data pertaining to the internal organic structures, and (D)

operating on the data from the sensors to produce an electronically encoded three-dimensional model or analog of the internal organic structures.

Claim 47 is submitted herein to replace claim 43 which was rejected as being anticipated by the Mochinski reference. Claim 47 distinguishes over Mochinski because that reference does not teach or suggest activating ultrasonic sensors to effectuate a solely electronic ultrasonic-wave scan of internal organic structures of a patient resulting in encoded three-dimensional structural data pertaining to the internal organic structures. Mochinski requires a mechanical scan in addition to an electronic scan.

Conclusion

For the foregoing reasons, independent claims 13 and 46-48, as well as the claims dependent therefrom, are deemed to be in condition for allowance. An early Notice to that effect is earnestly solicited.

Should the Examiner believe that direct contact with applicant's attorney would advance the prosecution of this application, the Examiner is invited to telephone the undersigned at the number below.

Respectfully submitted,

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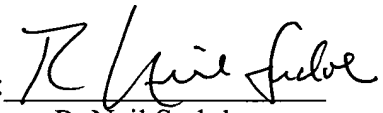
By: 

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